CLAIMS

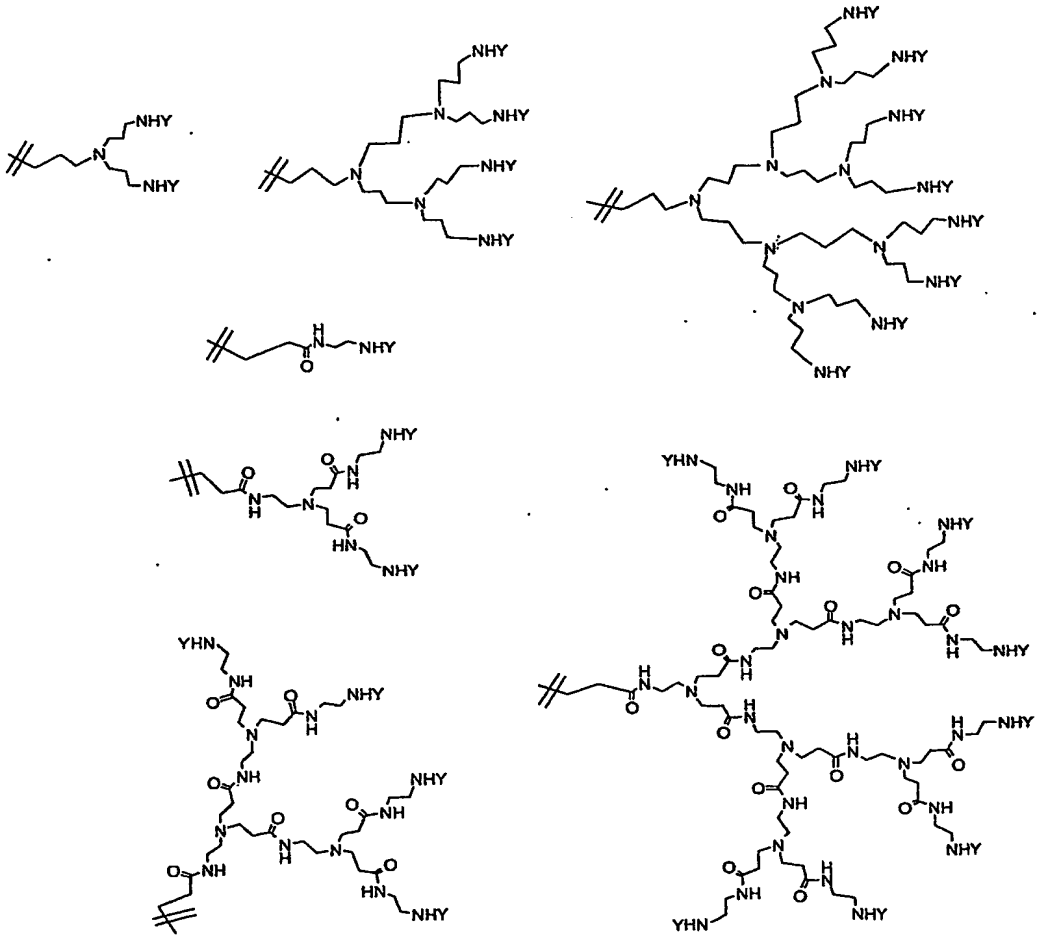
1. A dendrimer conjugate formed between a dendrimer and a protein solubilising substance, having the structure

$$D(R)_n$$

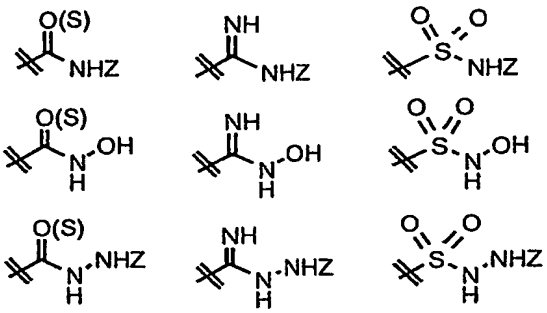
wherein

D is the dendrimer;

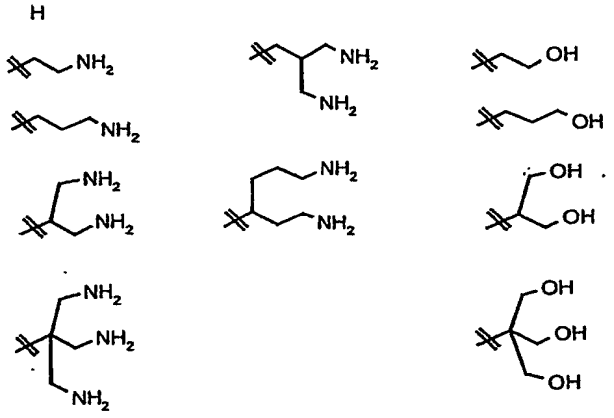
R is a radical of the protein solubilising substance which may be the same or different, and is selected from



wherein Y is selected from the group consisting of



wherein Z is selected from the group consisting of



and, n is an integer greater than 1;

said protein solubilising substance having a structure which is not found in the dendrimer, and the conjugate – upon treatment of protein aggregates with the dendrimer conjugate – causing an increase in the solubility of protein aggregates over that obtained upon treatment of protein aggregates under the same treatment conditions with a physical mixture of the dendrimer and protein solubilising substance, the physical mixture containing the same molar ratio of the protein solubilising substance to the dendrimer as that in the dendrimer conjugate, and the increase being evidenced by a protease assay as described herein.

2. A dendrimer conjugate according to claim 1, wherein the dendrimer is covalently bound to one or more same or different protein solubilising substances.

3. A dendrimer conjugate according to claim 1, wherein R is bound to the surface groups of the dendrimer.

4. A dendrimer conjugate according to any of claims 1-3, wherein the protein solubilising substance is a protein denaturant.

5. A dendrimer conjugate according to claim 4, wherein the protein denaturant is selected from the group consisting of ureas, thioureas, sulfonylureas, semicarbazides, hydrazides, thiosemicarbazides, guanidines and chaotropes.

6. A dendrimer conjugate according to any of claims 1-5, wherein the solubility of the protein aggregates is increased by a factor of more than 1 such as, e.g., at least 1.5 or at least 2.

7. A dendrimer conjugate according to any of claims 1-6 containing one or more surface groups which are not occupied by a protein solubilising substance

8. A dendrimer conjugate according to any of claims 1-7, wherein the dendrimer (D) is a multivalent functional dendrimer having a dendritic structure that extends from one or more core points through multiple generations of successive layers, with each layer having one or more branching points, to end in surface groups.

9. A dendrimer conjugate according to claim 8, wherein the dendrimer (D) is represented by the formula:

$$X\text{-}(V)_a\text{-}(W)_b$$

wherein X is a multifunctional segment having one or more branching points,
V is a linker or spacer group, which may be branched or linear
W is a surface group and
a and b are integers such that each linker group V terminates in one or more surface groups W.

10. A dendrimer conjugate according to any of claims 8 or 9, wherein the dendrimer is globular or tree-shaped.

11. A dendrimer conjugate according to any of claims 8-10, wherein the generation of the dendrimer ranges from 0 to 20 such as *e.g.* from 1 to 10 or from 2 to 6.

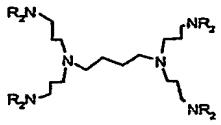
12. A dendrimer conjugate according to any of claims 8-11, wherein the molecular mass of the unmodified dendrimer lies from 50 to 30000 such as *e.g.* from 100 to 20000 or from 300 to 15000.

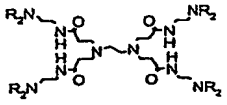
13. A dendrimer conjugate according to any of claims 8-12, wherein the number of surface groups on the dendrimer lies between 2 and 256 such as *e.g.* between 2 and 64, between 4 and 32 or between 8 and 32, such as *e.g.* 4, 8, 16, 32 or 64.

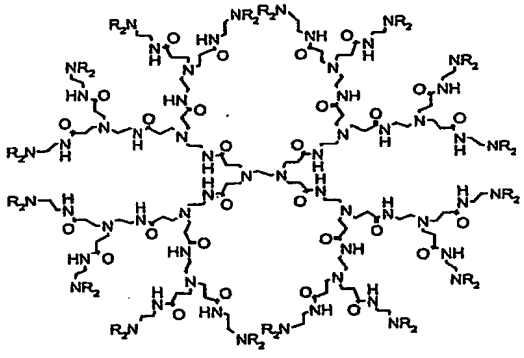
14. A dendrimer conjugate according to any of claims 8-13, wherein the surface groups of the dendrimer (D) are amine functionalities.

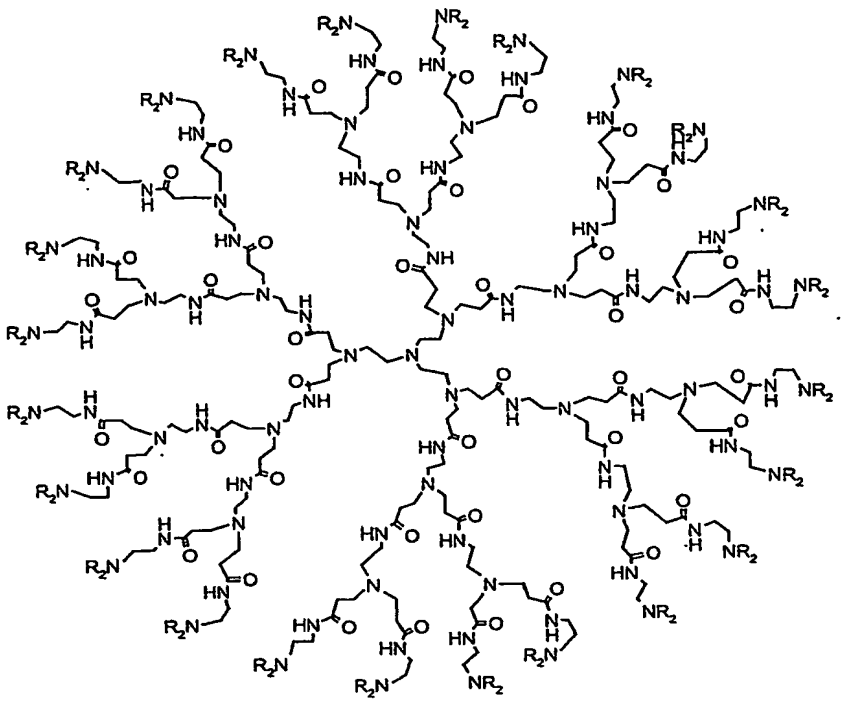
15. A dendrimer conjugate according to any of claims 8-14, wherein the dendrimer is a PPI dendrimer or a PEI dendrimer or a PAMAM dendrimer.

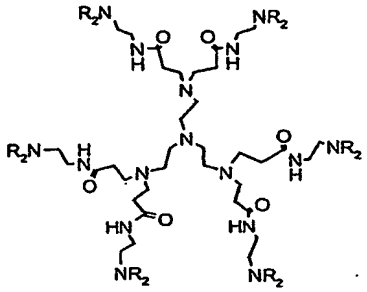
16. A dendrimer conjugate according to any of claims 8-15, wherein the dendrimer has one of the following structures











wherein R has the same meaning as in claim 1.

17. A dendrimer conjugate according to any of claims 1-7, wherein the dendrimer (D) is a conjugate of two or more multivalent functional dendrimers as defined in claims 10-18.

18. A dendrimer conjugate according to any of the preceding claims, which has an EC50 value of 10-500μg/ml, such as e.g. 20-200μg/ml, 30-100μg/ml or 50μg/ml, where EC50 is as defined herein.

19. Use of a dendrimer conjugate according to any of claims 1-18 in the treatment of protein aggregate related diseases.

20. Use according to claim 19, wherein the protein aggregate related disease is selected from the group consisting of Alzheimer's disease, Creutzfeldt-Jakob disease, variant Creutzfeldt-Jakobs disease, fatal familial insomnia, Gerstmann-Sträussler-Sheinker syndrome, PrP-cerebral amyloid angiopathy, scrapie, bovine spongiform encephalopathy, chronic wasting disease, transmissible mink encephalopathy, Pick's disease, Parkinson's disease, amyotrophic lateral sclerosis, frontotemporal dementia, diabetes type II, multiple myeloma-plasma cell dyscrasias, familial amyloidotic polyneuropathy, medullary carcinoma of thyroid, chronic renal failure, congestive heart failure, senile cardiac and systemic amyloidosis, chronic inflammation, atherosclerosis, familial amyloidosis and Huntington's disease.

21. Use according to any of claims 19 or 20, wherein the protein of the protein aggregate is selected from the group consisting of APP, Aβ peptide, α1-antichymotrypsin, tau, non-Aβ-component, presenillin 1, presenillin 2, apoE, prion protein including protease resistant prion protein, SOD, Pick body, α-synuclein, anylin, IgGL-chain, transthyretin, procalcitonin, β2-microglobulin, atrial natriuretic factor, serum amyloid A, ApoA1, Gelsolin and Huntingtin.

22. Use of dendrimer conjugates according to any of claims 19 or 20, wherein the protein aggregate related disease is a prion-related disease.

23. Use of dendrimer conjugates according to any of claims 19 or 20, wherein the protein aggregate related disease is an amyloid-related disease.

24. Use of dendrimer conjugates according to any of claims 1-18 to reduce the infectivity of prion proteins.

25. Use of dendrimer conjugates according to any of claims 1-18 in disinfection of material which has been contaminated with protein aggregates.

26. Use of dendrimer conjugates according to claim 25, wherein the protein aggregates are prion protein aggregates.

27. A method of identifying and/or classifying protein aggregates in a mammal, the method comprising the steps of:

a) treating the protein aggregates with a dendrimer conjugate as defined in claims 1-18

b) analysing one or more products of step a)

28. A method according to claim 27 wherein step b) comprises the steps of

I. incubating the treated protein aggregates from step a) with a broad spectrum protease such as *e.g.* proteinase K

II. detecting remaining protein aggregates by one or more methods selected from the group comprising: SDS-PAGE and immunoblotting with protein-specific antibodies, ELISA, immunoelectrophoresis and immunohistochemistry.

29. A method according to claim 27 wherein step b) comprises incubating the treated protein aggregates from step a) with an antibody which is sensitive to changes in the structure of a protein present in the protein aggregate.

30. A method according to claim 27 additionally comprising the step of further treating the treated protein aggregates from step a) with a protein denaturant such as *e.g.* urea between steps a) and b).

31. A method according to claim 27 further comprising the steps of

i) repeating steps a) and b) with a different dendrimer conjugate, and
ii) optionally comparing results from the dendrimer conjugates to obtain information on the origin of the protein aggregates.

32. Use of dendrimer conjugates according to any of claims 1-18 for identifying prion protein aggregates.

33. Use of dendrimer conjugates according to any of claims 1-18 for classifying the protein aggregates into specific strains according to their susceptibility to the method described in claim 27.

34. Use of dendrimer conjugates according to claim 33, wherein the protein aggregates are prion protein aggregates.

35. A method of preventing the formation of protein aggregates in cells or animals, the method comprising the treatment of cells or animals with a dendrimer conjugate according to any of claims 1-18.

36. A method for disinfecting an object, the method comprising contacting the object with a composition containing a dendrimer conjugate according to any of claims 1-18.

37. A method for removing protein aggregates from food that originates from an animal, the method comprising contacting the food with a composition containing a dendrimer conjugate according to any of claims 1-18.

38. A method for treating, preventing and/or diagnosing a protein aggregate related disease in a subject, the method comprising administering to the subject in need thereof a sufficient amount of a dendrimer conjugate according to any of claims 1-18.

39. Use of dendrimer conjugates according to any of claims 1-18 in the preparation of a medicament for use in the treatment, prophylaxis and/or diagnosis of protein aggregate related diseases.

40. A method for the preparation of a dendrimer conjugate according to any of claims 1-18 wherein the preparation is carried out while the dendrimer (D) is grafted to a solid phase support through a linker entity.

41. A method according to claim 40 wherein the linker entity is an acid labile linker, such as *e.g.* chlorotritylchloride, Wang, Rink, Sieber or related linkers.

42. A method according to claim 41 wherein the solid phase support is selected from the group comprising polystyrene, modified polystyrene and PEGA.

43. A method for the preparation of a dendrimer conjugate according to any of claims 1-18 in which the dendrimer conjugate contains surface sulfonylurea (sulfamide)

groups, the method comprising the reaction of dendrimer with a sulfonylamide (>SO_2NHR) reagent, such as e.g. chlorosulfonyl-isocyanate, halo-sulfamide, chlorsulfonyl-*tert*-butylsulfamate or other sulfonylamide reagent.

44. A method for the preparation of a dendrimer conjugate according to any of claims 1-18 in which the dendrimer conjugate contains surface guanidine groups, the method comprising the reaction of dendrimer with di-boc-S-methylisothiourea, di-Boc-thiourea or condensing agents such as carbodiimides, phosphonium salts or other condensing reagents.

45. A method for the preparation of a dendrimer conjugate according to any of claims 1-18 in which the dendrimer conjugate contains surface thiourea groups, the method comprising the reaction of dendrimer with thiocarbamoyl (-(C=S)NHR) reagents, such as e.g. alkyl-thiocarbamoyl halides or other thiocarbamoyl reagents.

46. A method for the preparation of a dendrimer conjugate according to any of claims 1-18 in which the dendrimer conjugate contains surface urea groups, the method comprising the reaction of dendrimer with carbamoyl (-(C=O)NHR) reagents such as e.g. alkyl-carbamoyl halides or other carbamoyl reagents.